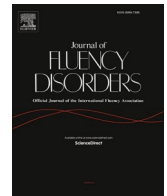




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# Stuttering therapy through telepractice in Turkey: A mixed method study

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## ABSTRACT

**Purpose:** The effectiveness of telepractice in stuttering therapy in Turkey may be unclear, but there is good evidence for the efficaciousness of it from other countries, e.g., Australia. The purpose of the present study is to compare the outcomes of telepractice and in-person therapy delivery on traditional stuttering treatment and explore telepractice stuttering therapy experience in Turkey.

**Methods:** 20 adults who stutter participated in the study. Half the participants received treatment via telepractice, while the others were provided with services in-clinic. Based on a convergent parallel mixed-method research, quantitative (Study 1) and qualitative data (Study 2) were collected in parallel, analyzed separately, and then combined. Study 1 included a non-inferiority controlled trial, repeated measures, quasiexperimental design. Within the scope of the quantitative research, the objective clinical data, including the scale and assessment scores, were collected from two groups in three stages. Study 2 used the phenomenology approach to assess the qualitative aspects of our study.

**Results:** According to the quantitative findings in Study 1, the effectiveness of telepractice and in-person in the post-test and follow up is not significantly different. The following themes emerged out of the qualitative data analysis in Study 2: expectation, telepractice-participant suitability and advantages of telepractice, technology, therapy techniques and clinician skills, therapeutic components, satisfaction, and preference.

**Conclusion:** The triangulation of quantitative and qualitative findings indicated that these data sets were compatible in general. The results show that telepractice is equally effective as the in-person method as a service delivery method for adults who stutter.

## 1. Introduction

### 1.1. Telepractice in speech-language pathology

Telepractice services are becoming increasingly widespread, and there is a growing number of research studies on the use of these services for speech and language therapy. Almost all research studies that have been conducted on speech and language disorders provide evidence on the flexibility, effectiveness, and suitability of telepractice for speech and language therapy services (e.g.,

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Edwards, Stredler-Brown, & Houston, 2012; Lowe, O'Brian, & Onslow, 2013; Mashima & Doarn, 2008; McGill, Cullen, & Webb, 2019; Reynolds, Vick, & Haak, 2009; Molini-Avejonas, Rondon-Melo, Amato, & Samelli, 2015; Theodoros, 2012). Telepractice not only serves as a credible option for those who have difficulty accessing in-person services but is also an effective alternative to in-person therapy on account of its multifaceted advantages (2012b, Towey, 2013; Tucker, 2012b). This delivery method may be indispensable for speech and language therapists (SLTs) since in-person services have been shut down due to the COVID-19 pandemic (Andricks & Smith, 2020).

Beside all the advantages of telepractice, this delivery method also has some barriers or challenges, such as unclear implementation standards, cost-benefit analysis or individual, technological and cultural factors in acceptance of telepractice (2012b, Lowe et al., 2013; Tucker, 2012b). Few studies have investigated clients' satisfaction levels (Kully, 2000; Mashima & Doarn, 2008; Mashima et al., 2003; Sicotte, Lehoux, Fortier-Blanc, & Leblanc, 2003; Towey, 2013). There are a few studies that have focused on clients' psychological characteristics, such as readiness and motivation (Tucker, 2012b; Valentine, 2014). New psychological aspects such as locus of control are being constantly included in the literature in relation to acceptance of telepractice (Call et al., 2015). In short, this concept is related to whether the person associates the outcome of their behavior with chance, fate or others (external) or their own behaviors (internal) (Rotter, 1990).

The perspectives of the users related to telepractice were examined in telehealth as well as in various other contexts within the scope of the David's (1989) Technology Acceptance Model (TAM) (Dunkley, Pattie, Wilson, & McAllister, 2010; Hu, Chau, Patrick, Liu Sheng, & Tam, 1999; Kowitlawakul, 2011; Tsai, 2013). In this model, it was suggested that perceived ease of use and perceived usefulness have an effect on the attitudes of those who are likely to use technology towards technology (Agarwal & Prasad, 1999). Dunkley et al. (2010) argued that SLTs would be reluctant to use telepractice unless they believe that the benefits offered by telepractice outweigh its challenges.

### 1.2. Stuttering therapy through telepractice

Stuttering therapy may be presented via the options of telepractice or in-person therapy (American Speech-Language-Hearing Association, 2002; Hill & Miller, 2012; Mashima & Doarn, 2008; Tucker, 2012a). Telepractice is advantageous in the treatment of fluency disorders because there are few specialized centers for treating stuttering, and is particularly advantageous in the long-term follow-up for maintenance that is frequently required (Mashima & Doarn, 2008). Studies have shown that stuttering treatments such as the Camperdown, the Lidcombe programs, and integrated treatment protocols can be provided through telepractice in almost all age categories. In many of these studies, it is evident that positive results are obtained in terms of objective clinical data showing reduction of stuttering severity (e.g., Bridgman, Onslow, O'Brian, Jones, & Block, 2016; Carey, O'Brian, Lowe, & Onslow, 2014; Carey, O'Brian, Onslow, Packman, & Menzies, 2012; Irani, Gabel, Daniels, & Hughes, 2012; Kully, 2000; O'Brian, Smith, & Onslow, 2014; Sicotte et al., 2003; Valentine, 2014).

In telepractice studies, only Bridgman et al. (2016) study included a randomized controlled design. The authors compared the outcomes of the in-person therapy and telepractice use of the Lidcombe Program in 49 children. Primary outcomes were percentage of syllables stuttered (%SS) at nine months post-randomization and the number of sessions to complete Stage 1. There was insufficient evidence of a difference between the groups in terms of %SS scores at nine months post-randomization. The number of sessions involved in the completion of Stage 1 revealed no significant differences between the two approaches and a similar distribution pattern for the two groups.

When client satisfaction with telepractice is examined, despite the challenges, users are satisfied, particularly with the convenience of this method of service delivery (e.g., Bridgman et al., 2016; Carey et al., 2014; Carey et al., 2012; Kully, 2000; Sicotte et al., 2003; Valentine, 2014). The challenges identified include technological concerns (Bridgman et al., 2016; Carey et al., 2012, 2014), transfer activities (Valentine, 2014), and the participation of the client (Carey et al., 2012, 2014; Valentine, 2014). Another barrier to telepractice can be a difficulty in building rapport or a therapeutic alliance between the therapist and the client (Tucker, 2012b; Valentine, 2014).

### 1.3. The potential for telepractice service for stuttering in Turkey

The Republic of Turkey is situated primarily in Western Asia (Anatolia) (95 %) and partially in Southeast Europe (5%). Turkey's population is approximately 82 million.

The field of speech and language therapy is still in its nascent stages in Turkey. The first program was introduced as an MSc program in 2000 in Eskişehir, Anadolu University, by academicians who received MSc or Ph.D. degrees from speech and language pathology/therapy programs in the USA and the United Kingdom. These academicians have pioneered the adaptation of traditional treatment methods to Turkish clients (Topbaş, 2006).

Currently, there are around 750 certified SLTs who can provide clinical services in Turkey. Most SLTs work in therapy centers located in metropolitan cities. According to the universal data on the epidemiology of stuttering (Bloodstein & Bernstein-Ratner, 2008; Guitar, 2014), the number of people who stutter (PWS) in Turkey is estimated to be around 900,000. As a result, clients must either receive services from non-SLTs (i.e., psychologists, special education teachers) in their area of residence or try to access in-person therapy services.

Telepractice (telehealth or telemedicine) has the potential to emerge as a viable alternative to in-person treatment methods for clients who are unable to physically travel to access health services (Reisman, 2010). Telepractice methods may be particularly promising in Turkey, which has witnessed a consistent increase in the use of the internet, smartphone, and e-shopping, especially

among young people (Deloitte, 2015; TurkStat, 2017; TUSIAD, 2017). However, Stanberry (1998) cautions that it would be a mistake to make investments in telepractice as a service delivery model before conducting preliminary research, as the effectiveness of telepractice as in-person therapy is still to be established. Furthermore, the experiences and perspectives about telepractice in Turkey are currently unknown.

#### 1.4. The purpose of the study, methodology, and schedule

The purpose of this study was to explore the experience of telepractice in Turkey and compare its effectiveness to in-person therapy. For this purpose, a convergent parallel mixed-method design (Creswell & Plano-Clark, 2011) was used, and in this context, two separate studies were conducted. Study 1 involved a quantitative comparison of the outcomes of traditional stuttering therapy methods via telepractice and in-person therapy. Study 2 explored the experiences and perspectives of the clinician and the telepractice group participants. Study 1 and Study 2 were carried out in parallel and analyzed separately. The results of Study 1 and Study 2 are discussed together in Section 4 Discussion.

Participants were assigned to telepractice and in-person groups, and the data collection process continued for nine months, as described in Fig. 1. Both the telepractice and in-person groups received the same number of therapy sessions. At the pre-test, post-test and follow-up stages, quantitative data were collected, and qualitative interviews were conducted in-person (see 2.1.3. Settings and technology for details). Quantitative measures included %SS scores, Stuttering Severity Instrument (SSI-4), self-perceived, and rater-perceived stuttering severity scores. Additionally, participants' experiences of stuttering were evaluated using the Overall Assessment of the Speaker's Experience of Stuttering (OASES), and the St. Louis Inventory of Life Perspectives, and Stuttering (SL-ILP-S). Finally, the qualitative experience of telepractice in Turkey through participant interviews and clinician reflections were documented. This paper aims to combine and contrast quantitative and qualitative results for both in-person and telepractice conditions.

## 2. Study 1: quantitative study

### 2.1. Method

#### 2.1.1. Research design

Non-inferiority controlled trial and pre-test, post-test, and follow-up quasi-experimental designs were used to compare telepractice and in-person therapy effectiveness on objective data in the present study.

#### 2.1.2. Participants

Twenty participants were selected according to the criterion-dependent sampling method from among 29 adults who stutter who responded to the requests in professional e-mail groups. Inclusion criteria were set to minimize sampling errors and bias. Inclusion criteria for the present study were a) volunteering for participation, b) being literate, c) at least 18 years of age, d) speaking Turkish natively, e) presence of stuttering confirmed by the participant and diagnosed by the first author with SSI-4 on the pre-test and f) the % SS score greater than 2% during oral reading or speaking with the speech-language therapist. People who had co-morbid mental,

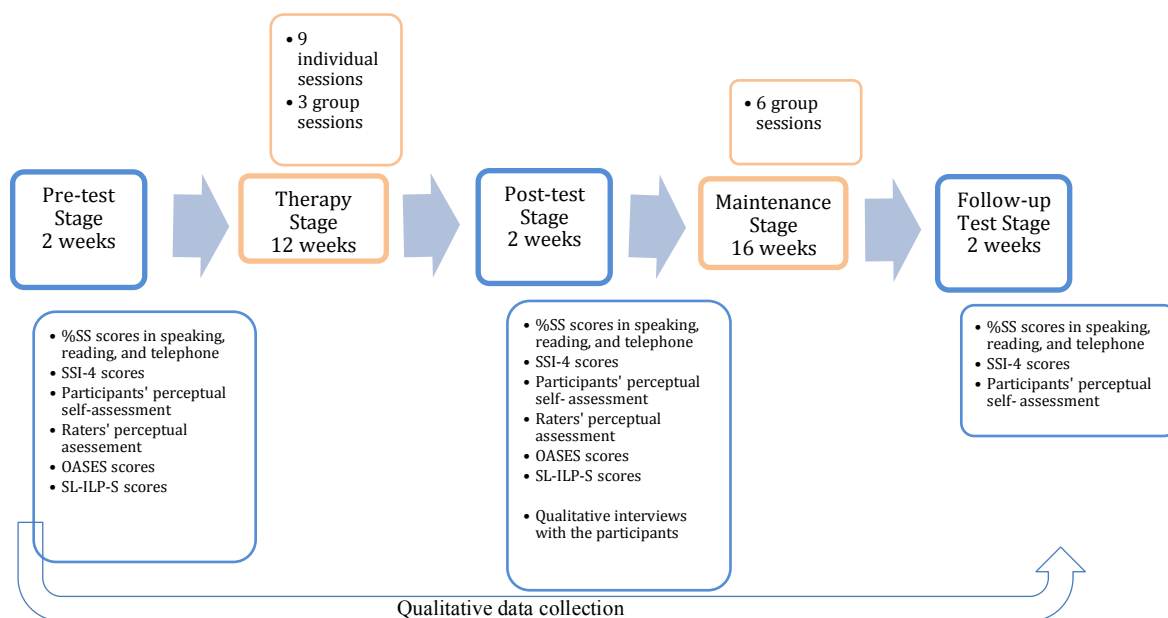


Fig. 1. Research schedule and data collection in Study 1 and Study 2.

neurological, sensory or communication disorders and/or had undergone psychiatric treatment or speech therapy within the past year, were excluded from the study. Additional inclusion criteria for the telepractice group were that participants have access to the internet, a headset and microphone, they possess basic computer skills and are unable to attend in-person facilities due to academic and/or occupational programs. Finally, a criterion of "being able to come to in-person assessments in the pre-test, post-test and follow-up stages" was determined for both therapy groups.

Based on the results of a two-week assessment (approximately three hours per participant), equal number of the participants were assigned to the telepractice and in-person therapy groups. Two groups of 10 participants were created. Group assignments were made after considering the potential challenges related to transportation difficulties and conflicts with academic-occupational programs. When assigning the participants to groups, randomization procedures were not followed; however, a concerted effort was invested to make the groups as homogenous as possible in terms of stuttering severity, gender and socio-economic level (Tables 1 and 2).

Participants ranged from 18 to 49 years old ( $M = 27.8$ ;  $SD = 5.12$ ), with the mean age being 29.9 in the telepractice group ( $SD = 9.24$ ) and 25.5 in the in-person therapy group ( $SD = 1.79$ ). A total of four participants (two from each group) have attended therapy sessions with an SLT before the study.

Ethical approval for this study was received from the Ethics Committee of Anadolu University. Informed consent to voluntarily participate in the study was obtained from all participants, and therapy was provided free of charge to all participants.

### 2.1.3. Settings and technology

In the present study, in-person therapy sessions and evaluations of telepractice and in-person therapy groups were performed in a private speech and language therapy center located in Istanbul. Telepractice sessions were administered by the first author, synchronously via the internet using Adobe Connect software, VDSL-access-type high-speed wired internet connection with 24 Mbps was used to ensure fast and stable internet access in the sessions. Telepractice sessions were conducted using an Apple MacBook laptop (1.3 GHz Intel Core i5 processor and 4 GB of 1600 MHz DDR3 memory). A Logitech C310 HD Webcam was used to improve the quality of the image and better enable adjustment of the computer camera angle. In addition, Philips SHP-1900 on-ear headphones were used to enhance the voice quality and clarity of the participants' conversations for the clinician. A Sony HDR-CX240, Full HD Camera was also used to video record all evaluations and in-person therapy sessions, while a Sony ICDUX533B audio recorder was used for all audio recordings.

### 2.1.4. Procedures

**2.1.4.1. Clinical procedures.** The active therapy period included nine individual 45-minute therapy sessions, followed by three 90-minute group sessions. After the post-test stage (lasting two weeks), the participants received six group therapy sessions during the 16-week maintenance stage. The first three sessions were held every two weeks. The sessions that followed were held once a month.

The first author administered both individual and group therapies for the telepractice and in-person therapy groups. In the therapy sessions, both fluency shaping (FS), stuttering modification (SM), and basic counseling approaches were applied together. The individualized approach was the treatment of choice based on the primary clinician's experiences, expertise, and best research evidence (American Speech-Language-Hearing Association, 2004). The first author holds an MSc and Ph.D. in the field of speech and language therapy and has lectured on stuttering and treated PWS for eleven years.

An individualized, combined, and flexible approach has been recommended in extant studies traditionally (American Speech-Language-Hearing Association, 1995; Conture & Curlee, 2007; Yairi & Seery, 2014; Yaruss & Quesal, 2002), and has also been utilized in some telepractice research (Kully, 2000; Sicotte et al., 2003; Valentine, 2014).

The steps of the treatment program including FS and SM activities used in the present study were based on a literature review in the related field (American Speech-Language-Hearing Association, 1995; Bloodstein & Bernstein-Ratner, 2008; Guitar, 2014; Guitar & McCauley, 2012; Topbaş et al., 2011; Yairi & Seery, 2014; Zebrowski & Kelly, 2002). The terminology used in the treatment is consistent with what is proposed by Turkish academicians with graduate training in speech and language pathology/therapy programs from US and UK Universities.

The stages of the therapy program have been developed for a typical client, such as T9. Equal time was allocated for both FS and

**Table 1**  
Telepractice Group Participants.<sup>a</sup>

Participant	Age	Sex	Occupation	Residence	%SS	Therapy experience
T1	36	Male	Computer Engineer	Ankara	9.6	No
T2	20	Male	University Student	Istanbul-Prague	21.4	No
T3	25	Male	University Student	Malatya-Diyarbakır	6.15	No
T4	28	Male	Industrial Engineer	Istanbul	7.3	Yes
T5	25	Male	Sales Representative	Bursa	6.4	No
T6	19	Female	University Student	Samsun (Vezirköprü)	2.7	No
T7	40	Male	Computer Engineer	Istanbul	6.8	Yes
T8	47	Male	Worker	Ankara	8.2	No
T9	34	Female	Statistician	Tekirdağ	6.8	No
T10	32	Female	Housewife	Yalova	6.3	No

<sup>a</sup> For the participants of the telepractice group, the codes like T1, T2 were used for the coding process.

**Table 2**  
In-person Therapy Group Participants.<sup>a</sup>

Participant	Age	Sex	Occupation	Residence	%SS	Therapy experience
I1	21	Female	Nurse	Istanbul	2.7	Yes
I2	33	Male	Technician	Istanbul	4.4	No
I3	27	Male	Chemical Engineer	Istanbul	5.6	No
I4	28	Female	Librarian	Istanbul	5.1	Yes
I5	22	Male	University Student	Istanbul	8.7	No
I6	29	Male	University Student	Istanbul	4.9	No
I7	19	Female	University Student	Istanbul	7.5	No
I8	29	Male	Accountant	Istanbul	5.2	No
I9	18	Male	University Student	Istanbul	4.6	No
I10	29	Female	Teacher	Istanbul	7.6	No

<sup>a</sup> For the participants of the in-person group, the codes like I1, I2 were used for the coding process.

SM. However, the sessions were individualized according to the therapeutic needs of each participant. Also, activities from previous stages were reinstated (or reviewed) when there was a clinical need regardless of the therapy stage. The treatment plan presented in Appendix A demonstrates how FS, SM, and counseling approaches are combined for a typical client.

**2.1.4.1.1. Information and identification stage.** This stage was comprised of two sessions over a two week period. The information about stuttering, participants' assessment scores, clinical impressions, and treatment program was initially provided, followed by an additional two weeks of 45 min weekly sessions. This stage was individualized for participants who might have had difficulty with the identification of stuttering, and the sessions consisted of identification and discussion activities. When the participants became successful in identifying their core stuttering behaviors and motivated for change, they moved to the following stage (Boyle, 2018).

**2.1.4.1.2. Fluency shaping and stuttering modification stage.** This stage consisted of seven sessions, which were conducted once a week and lasted 45 min. At this stage, the main goals of the SM procedures were to support the PWS in the exploration/identification of feelings, thoughts and behaviors related to stuttering and reduce avoidances related to stuttering. Also, the participants were trained to reduce their hard moments of stuttering (Yairi & Seery, 2014). Fluency shaping techniques were used to reduce the stuttering severity of participants (Boyle, 2018; Guitar, 2014). Consistent with the goals of FS, the criteria to be met was 1% or less SS.

**2.1.4.1.3. Group therapy stage.** This stage consisted of three sessions of group therapy, that started after completing nine sessions of individual therapy. Individual interviews also were conducted with each participant after every group session to identify personal goals. The purpose of the group therapy was to allow each participant to pursue their individual goals, as well as to receive and provide support for each other. The groups consisted of three to six members, each session lasting for 1.5 h and led by the clinician. The telepractice group received group therapy within itself in an online setting, and the groups were not mixed.

Many group activities were carried out in the program presented in Appendix A. The steps of group therapy sessions, and related activities were designed according to the stuttering literature as well as psychology and education (Fraser, 2007; Belmont, 2006; Manning, 2009; Ramig, 2003; Reitzes, 2006; St. Louis, Flynn, & Hutson, 2011; Ukens, 2004; Ward, 2006). Within the context of the FS and SM approach, individualized goals were determined for each participant (Damico, Müller, & Ball, 2012; Guitar, 2014).

**2.1.4.1.4. Maintenance stage.** Group therapy sessions, counseling sessions, and short individual interviews were held during the four-month maintenance period. The purpose of this stage was to encourage the participants to continue using their strategies for stuttering, cope with ongoing daily challenges and develop the ability to become their own therapist without the need for continued (direct) clinical intervention (Guitar, 2014; Louw, 1996).

**2.1.4.1.5. Counseling.** In addition to FS and SM approaches, the participants were also provided supportive counseling in the individual and group therapy sessions and via e-mail throughout the entire process. The clinician used therapeutic communication skills such as empathetic responses, and paraphrasing described in the literature (Flasher & Fogle, 2017; Ginsberg & Wexler, 2000; Sommers-Flanagan & Sommers-Flanagan, 2012; Sugarman & Yarus, 2000; Ward, 2006). These techniques were particularly useful in identification and desensitization activities related to feelings and thoughts in the scope of SM.

**2.1.4.2. Quantitative procedures and data collection.** The data collection of Study 1 consisted of three stages: 1) Pre-therapy assessment (pre-test), 2) Post-therapy assessment (post-test), and 3) Assessment after the four-month follow-up (Fig. 1).

The primary dependent variables were the participants' %SS scores during the spontaneous speech, oral reading, and telephone calls, their scores on the SSI-4, and their self-assessment scores on stuttering severity, all of which were measured in the pre-test, post-test and follow-up stages. The secondary data were the SLTs' scores on perceptual self-rating of severity, their scores on the OASES and SL-ILP-S, all of which were collected in the pre-test and post-test stages.

Independent SLTs calculated participants' disfluencies as measured by %SS scores from audio and video recorded samples of a minimum of 400-syllables collected from spontaneous speech, reading, and telephone conversations (Guitar, 2014).

As recommended by others (Onslow, Jones, O'Brian, Menzies, & Packman, 2008; Wilkie & Beilby, 1996), speaking on the telephone to a person not associated with the study and outside of the clinical context was chosen as a context to measure a dependent variable. These interviews were conducted without notifying participants of the exact day and hour of the call in order to receive an accurate sample of their fluency in a more difficult setting.

Three experienced SLTs from outside the study were trained in the assessment methodology before conducting pre-test and post-test ratings. The raters watched videos, then evaluated short intervals of at least 2 min each, using a 9-point Likert-type rating scale



where 1 = extremely mild stuttering and 9 = extremely severe stuttering. As recommended (Ingham & Cordes, 1997; O'Brian, Packman, Onslow, & O'Brian, 2004), participants also self-assessed their fluency level to improve the accuracy of rating across raters on the same scale in the pre-test, post-test, and follow-up stage.

### 2.1.5. Measures

**2.1.5.1. Stuttering Severity Instrument (SSI-4).** In the present study, a free translation of the SSI-4 was used. The original version of SSI-4, which is not yet adapted to Turkish in the adult population, was used to conduct a holistic assessment of the participants in the present study.

**2.1.5.2. Overall Assessment of the Speaker's Experience of Stuttering (OASES).** Since OASES (Yaruss & Quesal, 2006) has not been adapted to Turkish yet, we used a form that was translated to Turkish and reliability analysis was done by St. Louis et al. in a project that was conducted in Turkey (St. Louis et al., 2010; Topbaş et al., 2011). The original scale consists of 100 items, while the Turkish version comprised of 98, as two items were removed due to their incompatibility with the Turkish culture. The internal consistency coefficients of all subscales were found to be between .70 and .92. The correlation value between the two raters ( $r = .99, p = .000$ ) was found to be significant for all subscales at the level of  $p < .001$  (Topbaş et al., 2011).

**2.1.5.3. St. Louis Inventory of Life Perspectives and Stuttering (SL-ILP-S).** This scale was developed by St. Louis (2001) and adapted to the Turkish by Topbaş et al. (2011). The internal consistency of the scale was found to be .75, whereas the interrater reliability of the scale was assessed using the Spearman rank correlation coefficient, which was found to be significant at the level of  $p < .001$  ( $r = .99, p = .0001$ ).

### 2.1.6. Quantitative data analysis

The descriptive statistics pertaining to the objective clinical data and scale scores were examined. The Mann-Whitney  $U$  test was used to compare differences between %SS scores in the speech, reading and telephone of telepractice and in-person groups in the pre-test stage. The two-way analysis of variance (ANOVA) for repeated measures was used in order to assess the pre-test, post-test, and follow-up test data. The Mann-Whitney  $U$  test was also used in order to compare differences between the groups in participants where the group\*measurement common effect was found to be statistically significant as per the variance analysis.

### 2.1.7. Reliability

To ensure measurement reliability, participants' %SS scores on speech, reading, and talking on the telephone were calculated on the pre-test, post-test, and follow-up stages by a second independent SLT who was experienced in the stuttering assessment. Cronbach's alpha coefficients ranged from .98 to 1.00 on all measurements in three stages, indicating very high-level agreement between two raters.

The Cronbach's alpha coefficients for the scores assigned by three independent raters (SLTs), regarding the parameter of perceptual stuttering severity were found to be .773 in the pre-test and .803 in the post-test, which was again an indication of high agreement between the raters.

## 2.2. Results

The percentages and mean scores related to the telepractice group and in-person therapy group participants regarding %SS scores in spontaneous speech, reading, and telephone calls, as measured in the pre-test, post-test, and follow-up stages, are described below in Tables 3 and 4.

**Table 3**

The percentages and mean scores of participants in the telepractice group regarding the %SS scores in speaking, reading, and telephone calls, as measured in the pre-test, post-test, and follow-up stages.

Participant	Pre-test			Post-test			Follow-up		
	Speech	Reading	Phone	Speech	Reading	Phone	Speech	Reading	Phone
T1	9.6	6.75	3.82	2.33	0.4	1.5	2.9	1.9	3.47
T2	21.4	6.75	15.11	3.35	0.3	7.5	3.5	2	7.19
T3	6.15	2.25	6.18	0.2	0	0.7	1.75	0	1.7
T4	7.3	3.75	4.26	0.5	0.5	2.25	1	0.25	0.58
T5	6.41	14.25	7.48	0.8	0.5	4	1.5	0.5	4.25
T6	2.7	2.25	3.39	0.5	0.75	1.5	1.4	0.25	0.5
T7	6.8	4	7.1	0.2	0	1.5	0.75	2	1.21
T8	8.2	10.75	6.1	3.9	2.4	5	Withdrawn		
T9	6.8	16	3.25	0.8	1	2	1.3	0.5	3
T10	6.3	6	3.1	1.4	0.5	3.5	2	0.5	4.53
M and SD	$M = 8.17,$ $SD = 4.97$	$M = 7.28, SD$ $= 4.86$	$M = 5.98,$ $SD = 3.61$	$M = 1.4, SD$ $= 1.34$	$M = 0.64, SD$ $= 0.69$	$M = 2.95,$ $SD = 2.08$	$M = 1.79,$ $SD = 0.89$	$M = 0.88, SD$ $= 0.83$	$M = 2.94,$ $SD = 2.02$

Two participants had withdrawn from the study in various stages without information in advance (Tables 3 and 4). Only the pre-test data of I6 were collected; hence, the data of I6 were not included in the descriptive statistics and all statistical analyses in Study 1. Similarly, only pre and post-test data were collected from T8. Therefore, the obtained data were included only in the descriptive statistics and comparison analyses between pre-test and post-test data in Study 1. However, the data were not included in the analysis of variance (ANOVA) for repeated measures.

The %SS scores in the speech, reading and telephone of the telepractice and in-person therapy groups were not significantly different at the pre-test stage ( $U = 26.5$ ,  $Z = -1.23$ ,  $p = .21$ ;  $U = 18.50$ ,  $Z = -1.94$ ,  $p = .52$ ;  $U = 31.00$ ,  $Z = -.89$ ,  $p = .40$ ). No statistically significant difference was found between the effectiveness of telepractice and in-person therapy, in terms of decreasing the %SS scores during spontaneous speech ( $F_{(2, 32)} = 2.07$ ,  $p = .14$ ) and telephone calls ( $F_{(2, 32)} = .54$ ,  $p = .59$ ), in the pre-test, post-test, and follow-up stages, respectively. However, a statistically significant difference was found between the effects of telepractice and in-person therapy, in terms of decreasing the %SS scores during reading ( $F_{(2, 32)} = 4.79$ ,  $p = .02$ ). There was no significant difference between the two groups in terms of %SS scores in the reading at the pre-test, post-test and follow-up measurements ( $U = 18.50$ ,  $Z = -1.94$ ,  $p = .52$ ;  $U = 32.00$ ,  $Z = -.76$ ,  $p = .44$ ;  $U = 36.50$ ,  $Z = -.35$ ,  $p = .72$ ).

The decreases in %SS for both groups were compared as follows: post-test scores were compared to pre-test, follow-up phase scores were compared to post-test, and finally, follow-up phase scores were compared to pre-test in conditions of speech, reading, and speaking on the telephone. The results are illustrated in Tables 5 and 6 and Fig. 2.

As illustrated in Tables 5 and 6 and Fig. 2, the reduction rates in %SS scores between the two groups are heterogeneous in terms of speech, reading, and talking on the telephone. For example, the telepractice group decreased the %SS scores more than in-person group for the speech condition in the post-test and follow-up stages compared to the pre-test stage.

The pre-test, post-test, and follow-up SSI-4 total scores of participants in the telepractice and in-person therapy groups are illustrated below in Table 7.

Taking Table 7 into consideration, without making any distinction between the telepractice and in-person therapy groups, a statistically significant difference was found between the repeated measurements of both the SSI-4 scores of the participants ( $F_{(2, 32)} = 157.45$ ,  $p = .00$ ). However, no statistically significant difference was found between the effects of telepractice and in-person therapy concerning lowering the SSI-4 scores ( $F_{(2, 32)} = .03$ ,  $p = .97$ ).

The pre-test, post-test, and follow-up of participants' self-assessment scores using a 9-point Likert-type rating scale on stuttering severity in the telepractice and in-person therapy groups are illustrated below in Table 8.

Taking Table 8 into consideration, without making any distinction between the telepractice and in-person therapy groups, a statistically significant difference was found between the repeated measurements of participants' self-assessment scores ( $F_{(2, 32)} = 50.42$ ,  $p = .00$ ). However, no statistically significant difference was found between the effects of telepractice and in-person therapy concerning lowering the participants' self-assessment scores ( $F_{(2, 32)} = 2.19$ ,  $p = .13$ ).

Meanwhile, the descriptive statistics for the pre-test and post-test scores on rater-perceived stuttering severity scores of the participants by independent SLTs' in the telepractice and in-person therapy groups are described below in Table 9.

Without making any distinction between the telepractice and in-person therapy groups, a statistically significant difference was found between the repeated measurements of the rater-perceived stuttering severity scores ( $F_{(1, 18)} = 243.75$ ,  $p = .00$ ) (Table 9). However, no statistically significant difference was found between the effectiveness of telepractice and in-person therapy in terms of lowering the perceived stuttering severity scores ( $F_{(1, 17)} = 2.11$ ,  $p = .16$ ).

The descriptive statistics for the pre-test and post-test scores obtained by the participants of both groups on the OASES total scale and the General Information, Reactions to Stuttering, Communication in Daily Situations, and Quality of Life subscales are presented in Table 10.

When data in Table 10 were examined, without making any distinction between the telepractice and in-person therapy groups, a statistically significant difference was found between the repetitive measurements of the participants' scores on the OASES total scale and the General Information, Reactions to Stuttering, Communication in Daily Situations, and Quality of Life subscales (respectively,

**Table 4**

The percentages and mean scores of participants in in-person therapy group regarding the %SS scores in speaking, reading, and telephone calls, as measured in the pre-test, post-test, and follow-up stages.

Participant	Pre-test			Post-test			Follow-up		
	Speech	Reading	Phone	Speech	Reading	Phone	Speech	Reading	Phone
I1	2.7	14.75	5.35	1.75	0.3	0.7	0.5	1	6.19
I2	4.4	18.25	8.28	0.8	0.3	1.75	2.5	1.19	3.2
I3	5.6	13.5	7.2	0.3	0	1.25	0.25	0.25	1.87
I4	5.1	12.25	9.33	1.5	0.4	1	1	0.25	1.7
I5	8.7	5.25	6.54	0.9	0.3	1.25	0.9	0.5	3
I6	4.9	16.25	5.24	Withdrawn					
I7	7.5	9	7.23	0.4	0	2.75	1.95	0	5.25
I8	5.2	6	2.13	1.5	0.75	3	1.6	3.6	0.9
I9	4.6	11.25	3.13	1	0.9	2.75	2.2	1.75	2
I10	7.6	20.5	9.2	3.3	0.4	3.75	2.17	0	3
M and SD	M = 5.71, SD = 1.78	M = 12.31, SD = 4.85	M = 6.49, SD = 2.39	M = 1.27, SD = 0.91	M = 0.37 SD = 0.3	M = 2.02, SD = 1.06	M = 1.45, SD = 0.81	M = 0.95, SD = 1.16	M = 3.01, SD = 1.72



**Table 5**

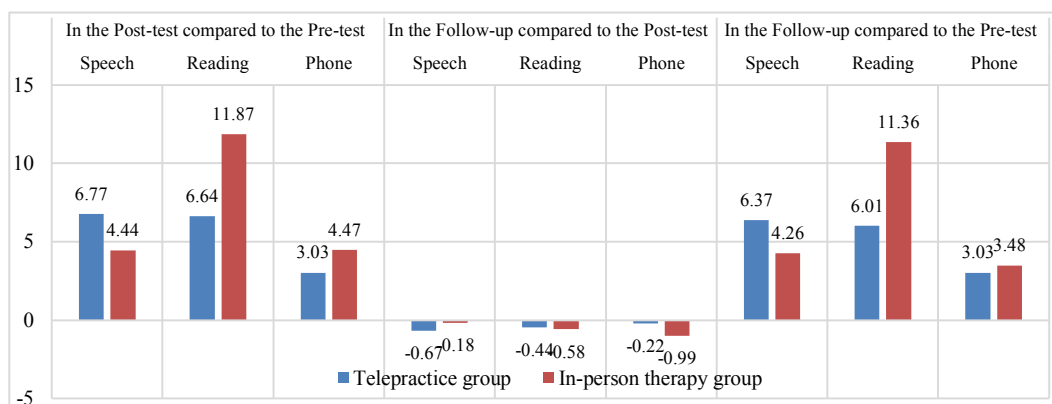
The decrease in the percentage of stuttered syllables (%SS) of the participants in the telepractice group on the post-test compared to the pre-test, the follow-up compared to the post-test, as well as the follow-up compared to the pre-test, in terms of speech, reading and talking on the telephone.

Participants	In the Post-test compared to the Pre-test			In the follow-up compared to the Post-test			In the follow-up compared to the Pre-test		
	Speech	Reading	Phone	Speech	Reading	Phone	Speech	Reading	Phone
T1	7.27	6.35	2.32	-0.57	-1.5	-1.97	6.7	4.85	0.35
T2	18.1	6.45	7.61	-0.15	-1.7	0.31	17.9	4.75	7.92
T3	5.95	2.25	5.48	-1.55	0	-1	4.4	2.25	4.48
T4	6.8	3.25	2.01	-0.5	0.25	1.67	6.3	3.5	3.68
T5	5.61	13.75	3.48	-0.7	0	-0.25	4.91	13.75	3.23
T6	2.2	1.5	1.89	-0.9	0.5	1	1.3	2	2.89
T7	6.6	4	5.6	-0.55	-2	0.29	6.05	2	5.89
T8	4.3	8.35	1.1	Withdrawn					
T9	6	15	1.25	-0.5	0.5	-1	5.5	15.5	0.25
T10	4.9	5.5	-0.4	-0.6	0	-1.03	4.3	5.5	-1.43
M (SD)	<i>M</i> = 6.77 (4.02)	<i>M</i> = 6.64 (4.35)	<i>M</i> = 3.03 (2.35)	<i>M</i> = -0.67 (0.36)	<i>M</i> = -0.44 (0.94)	<i>M</i> = -0.22 (1.08)	<i>M</i> = 6.37 (4.35)	<i>M</i> = 6.01 (4.78)	<i>M</i> = 3.03 (2.78)

**Table 6**

The decrease in the percentage of stuttered syllables (%SS) of the participants in the in-person therapy group on the post-test compared to the pre-test, the follow-up compared to the post-test, as well as the follow-up compared to the pre-test, in terms of speech, reading and talking on the telephone.

Participants	In the Post-test compared to the Pre-test			In the follow-up compared to the Post-test			In the follow-up compared to the Pre-test		
	Speech	Reading	Phone	Speech	Reading	Phone	Speech	Reading	Phone
I1	0.95	14.45	4.65	1.25	-0.7	-5.49	2.2	13.75	-0.84
I2	3.6	17.95	6.53	-1.7	-0.89	-1.45	1.9	17.06	5.08
I3	5.3	13.5	5.95	0.05	-0.25	-0.62	5.35	13.25	5.33
I4	3.6	11.85	8.33	0.5	0.15	-0.7	4.1	12	7.63
I5	7.8	4.35	5.29	0	-0.2	-1.75	7.8	4.75	3.54
I6	Withdrawn								
I7	7.1	9	4.48	-1.55	0	-2.5	5.55	9	1.98
I8	3.7	5.25	-0.87	-0.1	-2.85	2.1	3.6	2.4	1.23
I9	3.6	10.35	0.38	-1.2	-0.85	0.75	2.4	9.5	1.13
I10	4.3	20.1	5.45	1.13	0.4	0.75	5.43	20.5	6.2
M (SD)	<i>M</i> = 4.44 (1.94)	<i>M</i> = 11.87 (5)	<i>M</i> = 4.47 (2.75)	<i>M</i> = -0.18 (1.03)	<i>M</i> = -0.58 (0.91)	<i>M</i> = -0.99 (2.09)	<i>M</i> = 4.26 (1.84)	<i>M</i> = 11.36 (5.36)	<i>M</i> = 3.48 (2.63)



**Fig. 2.** Means of decrease in the percentage of stuttered syllables (%SS) of the participants in telepractice and in-person therapy groups.

$F_{(1, 17)} = 105.04$ ;  $F_{(1, 17)} = 47.29$ ;  $F_{(1, 17)} = 74.62$ ;  $F_{(1, 17)} = 33.40$ ;  $F_{(1, 17)} = 73.51$ ;  $p = .00$ ). However, no statistically significant difference was found between the effectiveness of telepractice and in-person therapy with regard to lowering the scores on the OASES total scale and the General Information, Reactions to Stuttering, Communication in Daily Situations, and Quality of Life subscales (respectively,  $F_{(1, 17)} = .09$ ,  $p = .77$ ;  $F_{(1, 17)} = 1.75$ ,  $p = .20$ ;  $F_{(1, 17)} = .33$ ,  $p = .57$ ;  $F_{(1, 17)} = .01$ ,  $p = .91$ ;  $F_{(1, 17)} = .04$ ,  $p = .85$ ).

The descriptive statistics for the pre-test and post-test SL-ILP-S scores of participants in telepractice and in-person therapy groups are presented in Table 11.

The data in Table 11 (without making any distinction between the telepractice and in-person therapy groups) show a statistically

**Table 7**

The descriptive statistics for the pre-test, post-test, and follow-up SSI-4 scores of the participants in the telepractice and in-person therapy groups.

Group	Measurement	<i>n</i>	Mean ( <i>SD</i> )
Telepractice	Pre-test	9	27.2 (6.9)
	Post-test	9	7.8 (4.6)
	Follow-up	9	8.4 (5.3)
In-person	Pre-test	9	30.2 (5.4)
	Post-test	9	10.9 (6.2)
	Follow-up	9	11 (5.3)

**Table 8**

The descriptive statistics for the pre-test, post-test, and follow-up participants' self-assessment scores in the telepractice and in-person therapy groups.

Group	Measurement	<i>n</i>	Mean ( <i>SD</i> )
Telepractice	Pre-test	9	5.6 (1.2)
	Post-test	9	3.4 (1.1)
	Follow-up	9	3.6 (.9)
In-person therapy	Pre-test	9	6.2 (.9)
	Post-test	9	2.9 (.6)
	Follow-up	9	3.4 (.8)

**Table 9**

The descriptive statistics for the perceived severity of stuttering scores of the participants in telepractice and in-person therapy groups.

Group	Measurement	<i>n</i>	Mean ( <i>SD</i> )
Telepractice	Pre-test	10	5.83 (1.4)
	Post-test	10	3.03 (1.4)
In-person therapy	Pre-test	9	6.00 (1.1)
	Post-test	9	2.63 (0.7)

**Table 10**

The descriptive statistics for the pre-test and post-test OASES total scale and the General Information, Reactions to Stuttering, Communication in Daily Situations, and Quality of Life subscale scores of the participants in the telepractice and in-person therapy groups.

Group	Measurement	<i>n</i>	General Information Mean ( <i>SD</i> )	Reactions to Stuttering Mean ( <i>SD</i> )	Communication in Daily Situations Mean ( <i>SD</i> )	Quality of Life Mean ( <i>SD</i> )	Total Score Mean ( <i>SD</i> )
Telepractice	Pre-test	10	62.3 (10.3)	61.3 (13.4)	57.3 (13.9)	57.4 (19.6)	59.5 (12.8)
	Post-test	10	40.9 (9.9)	48.1 (12.5)	34.6 (11.4)	38.0 (13.5)	40.8 (10.1)
In-person therapy	Pre-test	9	65.5 (6.4)	63.7 (13.2)	62.5 (8.7)	58.0 (19.0)	62.2 (10.6)
	Post-test	9	45.3 (5.3)	44.3 (8.2)	42.6 (5.6)	39.4 (9.9)	42.7 (5.9)

significant difference between the repetitive measurements of the participants' SL-ILP-S scores ( $F_{(1,17)} = 75.24, p = .00$ ). However, no statistically significant difference was found between the effectiveness of the telepractice and in-person therapy in terms of decreasing the SL-ILP-S scores ( $F_{(1, 17)} = .00, p = .96$ ).

In summary, no difference was found between the telepractice and in-person groups in terms of all quantitative comparisons at post-

**Table 11**

The descriptive statistics for the pre-test and post-test SL-ILP-S scores of participants in the telepractice and in-person therapy groups.

Group	Measurement	<i>n</i>	Mean ( <i>SD</i> )
Telepractice	Pre-test	10	63.30 (16.20)
	Post-test	10	43.00 (13.88)
In-person therapy	Pre-test	9	67.55 (13.75)
	Post-test	9	47.00 (14.40)

test and follow-up phases.

### 3. Study 2: qualitative study

#### 3.1. Method

##### 3.1.1. Research design

The phenomenology approach, as a qualitative research method, was used to explore participants' telepractice experiences (Moustakas, 1994).

##### 3.1.2. Participants

In Study 2, the perspectives of the participants ( $n = 10$ ) in the telepractice group were examined in order to gain additional insight into the client's satisfaction with telepractice. Information about the participants of the Telepractice group is shared under the title of 2.1.2. Participants in Study 1.

##### 3.1.3. Qualitative procedures and data collection

Qualitative data were gathered throughout the study. The participants' opinions that were communicated verbally and through e-mails were recorded, and their behaviors were observed and noted during the entire research process. Additionally, the clinician's perspectives were noted as per the specifications laid down by Moustakas (1994). The semi-structured individual interviews were conducted by two SLTs who were independent from the study, in-person with the participants in the telepractice group following the 3-month active therapy period.

A content analysis was applied to identify common themes and determine how participants perceived, conceptualized, and evaluated their telepractice experiences. In this regard, the systematic approach developed by Moustakas (1994) and reworked by Creswell (2007) were used in the qualitative research procedures. In order to define the scope of qualitative research, the following research question was developed: What are the telepractice experiences of adults who stutter living in Turkey? This study provides a detailed description of these experiences, from which a rich dataset was collected.

Prior to these interviews, the clinicians were trained on the points that needed to be taken into account. Compatible with the suggestions offered by Creswell (1998), the interviewers met the participants, had a short conversation with them, explained the purpose of the interview, and asked general questions in order to get familiar with each participant. Then, they asked the participants open-ended questions related to the main research questions in a comfortable communication environment (Table 12). The duration of these interviews was between 30 min and 60 min. After receiving written consent from the participants, audio and video recordings of all interviews were taken.

##### 3.1.4. Qualitative data analysis

Following the relevant literature (Creswell, 1998, 2007; Moustakas, 1994; Plexico, Manning, & DiLollo, 2005; Riemen, 1986; Creswell, 1998), a content analysis was performed in order to determine how participants perceived the experience of telepractice (Table 13).

##### 3.1.5. Trustworthiness

Lincoln and Guba (1985) suggested credibility, transferability, dependability and conformability strategies in order to increase trustworthiness, which, in effect, corresponds to the validity and reliability concepts used in the context of quantitative research, to improve the quality of qualitative research. In the present study, the strategies proposed by Creswell (1998, 2007) and Lincoln and Guba (1985), along with the methods applied in this context, are summarized in Table 14.

#### 3.2. Results

Participants' and clinician's experiences and perspectives about telepractice can be understood according to seven themes and several subthemes: 1) expectation, 2) telepractice-participant suitability and advantages of telepractice, 3) technology, 4) therapy

**Table 12**

Semi-structured interview questions.

- 
- 1 What was it like to undergo stuttering therapy without any in-person interaction with the therapist?
  - 2 Did telepractice fit you? If so, why? If not, why not?
  - 3 Do you gain any experience from the telepractice that would contribute to this study?
  - 4 How would you compare telepractice and in-person therapy?
  - 5 Did you experience any problems with the implementation of the techniques used in the stuttering therapy provided online?
  - 6 How did the lack of direct eye contact in telepractice affect the therapy process from your perspective?
  - 7 What were the differences between group and individual telepractice therapy sessions? What were their advantages and disadvantages?
  - 8 If you had the option, would you choose telepractice therapy or in-person therapy for your next therapy? Why?
  - 9 What would you recommend to make telepractice more effective for individuals?
-

**Table 13**

Steps of the content analysis.

1	The interviews with participants were transcribed and read by the researchers.
2	Meaningful units corresponding to an idea were defined in each transcript.
3	Meaningful units were formulated and coded.
4	Common meaningful units of the participants were compared and identified, followed by clustering of sub-themes, identification, and naming of main themes, the grouping of the units differing in meaning, and identification of sub-themes. Finally, expressions were clustered into definitions or meaningful phrases by identifying overlapping and repetitive expressions that were considered important (Creswell, 2007).
5	The resulting categories were comprehensively examined with a view to creating a vivid description of the experiences examined. These data were used to write explanations about the contexts or environments affecting the experiences of the participants and how they had experienced them. Additionally, frequency and percentage tables were created for definitions that could fall under two or more categories. At this stage, the researchers also defined his own experiences in addition to the contexts and situations affecting these experiences.

**Table 14**

Strategies to establish trustworthiness.

Criteria	Strategies
Credibility	<p><i>Prolonged Engagement</i>: This was provided through interaction with the participants for nine months. Participants were encouraged to give long, detailed answers in the 45–60 minute interviews.</p> <p><i>Persistent Observation</i>: The study was conducted with many sources and methods (e.g., interviews, observation) until there was a saturation of data.</p> <p>This was conducted with many sources and methods until there was a saturation of data.</p> <p><i>Triangulation</i>: Source methods (interviews and observations), sources (participants and the clinician), and quantitative/qualitative datasets were triangulated.</p> <p><i>Peer Debriefing</i>: The authors discussed relevant questions or concerns posed by the peers. Authors and auditors who were experienced in the qualitative method discussed the data analysis.</p> <p><i>Negative Case Analysis</i>: Samples with non-supporting results were presented (e.g., T1).</p> <p><i>Referential Adequacy</i>: All of the interviews and the therapy sessions were recorded. In addition, the researchers received field notes.</p> <p><i>Member Checks</i>: Verbatim records of the interviews, and results were verified by participants.</p> <p><i>Interview Guide</i>: A guide was provided to the independent interviewers.</p>
Transferability	<p><i>Purposeful Sampling</i>: Significant variation was found in the participants' stuttering characteristics and backgrounds. Extremely severe cases of % SS were not included in the study. The participants were assigned to groups in accordance with their preferences. The characteristics of the participants were fully explained. Data were collected from the participants and from the clinician who had experience in this study.</p> <p><i>Dense description</i>: A detailed description of the methodology, settings, participant characteristics, data collection procedures, and results were provided to enable replication of the study.</p> <p><i>Direct quotations</i> from the participants were presented and made accessible.</p> <p><i>Triangulation and Prolonged Engagement</i>: See definition under <i>Credibility</i>.</p> <p><i>Reflexivity</i>: The researchers' perspectives and attitudes towards telepractice were reported.</p>
Dependability	<p><i>Dense Description</i>: Transcription materials and field notes were kept as an audit trail.</p> <p><i>Consistency</i>: The research questions were asked comprehensively and clearly. Efforts were made to secure consistency between all components of the study. The same data collection methods were used. The researchers and independent experts reached a consensus about the results and conclusions.</p> <p><i>Triangulation, Prolonged Engagement, and Peer Debriefing</i>: See definition under <i>Credibility</i></p>
Conformability	<p><i>Audit trail</i>: Database accessibility (external observer control for databases)</p> <p><i>Authority of Researcher</i>: The data, data analysis, and results were audited by a qualified expert experienced in qualitative research.</p> <p><i>Negative case analysis, Dense Description, and triangulation</i>: See definitions above.</p>

techniques and clinician skills, 5) therapeutic components, 6) satisfaction and 7) preference.

### 3.2.1. Theme: expectation

This theme concerned the participants' expectations of telepractice. Two participants from the telepractice group ( $n = 10$ ) felt that telepractice would not be as successful as in-person therapy, while three participants expected low-quality interaction between themselves and the clinician. However, four participants who had similar opinions stated that their negative opinions changed over time, and two further noted that they became accustomed to telepractice. The majority of the participants ( $n = 6$ ) expected that telepractice would not be as successful as in-person therapy, and the interactions between themselves and the clinician would be poor in the online environment. However, all of these participants reported that they became accustomed to telepractice and/or changed their opinions.

### 3.2.2. Theme: Telepractice-participant suitability and advantages of telepractice

This theme focused on whether participants found the treatment appropriate for themselves or not. Nine out of 10 participants felt that telepractice was suitable for them, and they often explained it with the advantages of telepractice as follows.

**3.2.2.1. Time and space flexibility.** Another issue highlighted was the difficulty finding adequate time for in-person therapy ( $n = 5$ ). Participants felt that work and other duties created conflicts with in-person therapy, while telepractice allowed them to chose flexible hours for treatment without the additional travel time. Even the participants who lived in Istanbul preferred telepractice due to the

time-consuming nature of traveling to therapy centers. Another prominent issue raised by the participants was the difficulty of securing an in-person appointment with SLTs at a mutually convenient time.

The participants emphasized the advantage of "space flexibility" when explaining the suitability of telepractice for themselves. For example,

I did not have to be at home. I could get [telepractice] at work, here, there, and anywhere. (T7)

Telepractice also has advantages for the clinician, who is able to conduct therapy in other settings than the clinic, or during breaks/vacation times.

**3.2.2.2. Computer usage skills.** Participants also emphasized the importance of being competent in computer usage ( $n = 2$ ) and familiar with online communication tools ( $n = 2$ ). However, T6 said that even though she had limited computer skills, and faced continuous technological problems, she was positive about the telepractice sessions and felt that those problems did not affect the process.

**3.2.2.3. Personality and lifestyle characteristics.** Another point emphasized by participants regarding the suitability of telepractice relates to personality and lifestyle characteristics. This issue was also related to the theme of therapeutic components (3.2.5.). Some participants expressed their preference for telepractice, e.g., T9 said: "I do not like being restricted; for example, being at a specific place at a specific time... (...) [Telepractice] provides a therapy service without restricting your life." Others would prefer in-person treatment, e.g., T7 said: "I think in-person therapy would appeal to me more [than telepractice] because as a person, I like close contact and 'touching'."

Personal characteristics, including "shyness" and "avoidance of social situations" ( $n = 2$ ), also affected participants' experience of telepractice. One expressed that telepractice worked best for him as he avoided being in social environments. Another participant expressed that he felt more confident when the therapist was not physically present in the room:

We, PWS, are a little shy [than fluent-speaking people]. (...) So telepractice is more comfortable [than in-person therapy]. (...) You feel like you are in front of the television. (T10)

However, another expressed the following concern about telepractice:

The client is shy and would benefit from more contact. Then, telepractice is a type of therapy where they would easily be able to avoid contact. (...) Some people would be able to avoid having direct contact and hide their problems during telepractice sessions. (...) However, a therapist can discern these problems more quickly in an in-person therapy session. (T9)

### 3.2.3. Theme: technology

This theme reflects the experiences with the technology used and the difficulties encountered.

**3.2.3.1. Positive and negative experiences.** The foremost satisfaction of the participants and the clinician was related to the Adobe Connect system used. Some participants ( $n = 4$ ) found the software system to be highly professional and very well-functioning. The clinician reported that the possibility of recording each session provided great advantages. The "collaboration" option of Adobe Connect and private correspondence option were useful for group sessions.

The clinician and participant reported more difficulties than expected. Technical difficulties were related to the internet connection ( $n = 8$ ), hardware ( $n = 4$ ), and sound ( $n = 4$ ). According to the clinician, the technological problems he encountered were sometimes simple, sometimes complex, or sometimes were unidentifiable.

The participants reported that technological problems affected group therapy more than individual therapy. The clinician sometimes reported long delays in beginning a therapy session due to the connection problems of some participants, and therefore, he had difficulty in reaching the target group size. Another concern was routine audio delays, leading to problems in the speaking turns of the participants in group therapy.

**3.2.3.2. Coping with and prevention of technological problems.** Some participants had difficulty using a computer ( $n = 3$ ). T8 and T10 overcame this problem with the support they received from their family members. Also, T8 reported that he learned how to use the system through guided steps on how to use the computer. T7 recommended providing basic training to telepractice candidates on the technology in an in-person environment.

Having adequate equipment and preliminary preparation were essential factors that needed to be considered while preparing for the therapy. Also, it was important for the telepractice candidate to participate in sessions with a familiar computer for him/her. T4 also emphasized "the importance of a fast and stable internet connection," as well as "the need for a good headset and microphone." According to the clinician, the lack of a headset caused sound reverberation problems. Additionally, the use of a wired internet connection increased the stability of the internet. Regarding Adobe connect, the option of being able to lower the audio and video quality when the internet connection speed dropped made it easier to continue with the sessions.

### 3.2.4. Theme: Therapy techniques and clinician skills

This theme focuses on the appropriateness of receiving stuttering therapy via telepractice. Nine of the 10 participants experienced no restrictions or limitations in applying therapy techniques in an online environment. However, some of the participants questioned the accuracy of the therapist's ability to know whether techniques were being precisely applied by the participants, particularly where the therapist may not have caught the emotional reactions of the participants online. The clinician supported these perspectives of the

participants and added that he had almost less control regarding the treatment via telepractice, and he felt that what he was saying to the participants were not being completely transmitted to them. He stated that he got more frequently nervous and felt the need to speak louder more often in comparison to in-person therapy. The clinician also pointed out that he had great difficulty in discerning some situations, such as when the participants paused to think, timing delays with audio or visual components, or silent stuttering moments. Also, choral exercises could not be done due to sound asynchrony.

### 3.2.5. Theme: therapeutic components

This theme came out of some interrelated psychological aspects that emerged while explaining the participants' experiences. The subthemes are as follows:

**3.2.5.1. Naturalness, adaptation to telepractice and eye contact.** While explaining their experiences, the participants referred to the notions of naturalness, sense of reality, and adaptation. Participants T3, T4, T5, and T9 used the word "natural" for describing their telepractice experiences. T5 and T7 stated that they did not have a "sense of distance". For example,

*Even if we do not meet in-person, thanks to the significant developments in technology, you can almost shake hands with people, putting your hands on the screen. (T4)*

Two participants talked about how they initially had negative feelings about telepractice, but as the therapy progressed, they experienced a positive adaptation process.

Despite positive perspectives on naturalness, T7 and T10 emphasized the importance of a realistic environment for the effectiveness of stuttering therapy. T7 stated that the level of anxiety was lower in telepractice. For example, T7 offered the following opinions about in-person therapy:

*My problem appears when I am in a social environment. If there are one or two people here... my speech problem will get severe, whereas when they are (...) not around me in an [online environment] (...) There is nobody when you turn off the screen. (T7)*

In this regard, T6 suggested there must be "in-person interviews with clients before the therapy session ends.", and T7 further suggested working with different people at regular intervals and performing group therapies in-person.

Another prominent issue related to reality and naturalness was the possible effect of telepractice on having eye contact. All participants stated that they did not have any problems regarding eye contact ( $n = 10$ ).

**3.2.5.2. Concentration, motivation, and responsibility.** T5 described his feelings on this, saying that there was "a lack of concentration due to being in a [living] room." In this direction, T1 added:

*The internet connection may cut off in online therapy, or something can happen; for example, the doorbell rings, the phone rings. I quickly lose my attention. (T1)*

Moreover, according to T7, "[his] concentration is disturbed and [the therapy] becomes inefficient." The clinician also complained that despite being reminded, some participants sometimes "acted constantly as if they were not in a therapy session" (they would do things like feeding their cat or eat). These behaviors also disturbed T1 in group therapy.

Participants and the clinician referred to the concept of responsibility in explaining concentration and motivation. For example, T2 stated that telepractice imposed less responsibility than in-person therapy. In parallel, the clinician reported that some of the telepractice group participants canceled their sessions without reason more frequently on the designated session days than the participants in the in-person therapy group. Telepractice sessions usually delayed due to reasons such as participants coming late to sessions rather than technological problems.

Looking at the positive examples of motivation and responsibility, the clinician observed that the participants who live in distant cities, such as T3 and T6, and those who have no experience with any therapy or training were more committed to the process and experienced more considerable positive differences in their speech fluency.

T5 and T9's perspectives on the relationship between motivation and responsibility are remarkable:

*If you pursue this process personally, you really have no chance of failing. [Success] (...) is related to something about your desire to follow. (T5)*

*In telepractice, the clinician explains techniques. It is up to you to keep it alive when you turn off [the computer]. Also, in in-person therapy, the clinician explains techniques in the clinic. It's in your hands to go out and use them. (T9)*

**3.2.5.3. Therapeutic relationship.** In the statements as mentioned above, although there was content related to the therapeutic relationship, some participants made more direct references to this subtheme and gave particular importance to in-person therapy. For example,

*Of course, in-person [therapy] provides a different and warmer environment. (T4)*

On the other hand, some participants, such as T8, needed help for using the computer. The clinician complained that the presence of another person in the therapy setting delayed the establishment of a therapeutic relationship between him and the participants.

T1 preferred in-person therapy, and pointing to a therapeutic relationship; he mentioned:

*I did not prefer telepractice independently of [my therapist]. (T1)*

T4's sensitivity towards selecting a therapist can be presented in this context. Regarding this, he said:



*I am a very selective person, especially when it comes to the therapist from whom I will receive speech therapy, so I want to meet in-person with the person I'll be working with. (...) After [the preliminary interview], [the synergy] already develops naturally. (T4)*

### 3.2.6. Theme: satisfaction

This theme highlights the satisfaction and perceived benefit of the participants. Nine participants reported that they had benefitted from telepractice. For example, a participant said:

*If you follow the [telepractice] schedule, it will be absolutely beneficial to you. (T4)*

It was the clinician's opinion that since the telepractice group consisted mainly of young participants who were interested in technology, the group had a high level of satisfaction with telepractice. Participants described their satisfaction levels by evaluating the telepractice method, the therapy content and additional support presented during the therapy, and the clinician's approach. The resulting subthemes are presented below.

**3.2.6.1. Satisfaction with the therapy program and additional supports.** Participants expressed their satisfaction with the therapy process, using words such as "intense", "rich content", "including different things each week", "relaxing", "developing", "informative", "comforting", "healthy", and "effective". Four participants indicated that some additional supports, such as informative e-mails and model videos, were useful. For example,

*[The clinician] constantly informed us via e-mails. (...) He never left us alone in this process. (T7)*

**3.2.6.2. Satisfaction with the group telepractice.** The participants stated that group telepractice is more fun and comfortable than individual telepractice. Mainly, the negative experiences included interactions between the group members and the behaviors of the members. For example, T1 noted that he was disturbed by other participants' behaviors such as doing some other things during the group telepractice sessions.

**3.2.6.3. Satisfaction with clinician.** Participants used expressions such as "prepared", "positive", "self-sacrificing", "patient" and "understanding" while evaluating the clinician. On the other hand, the clinician sometimes found this process very exhausting due to technological problems and the nature of telepractice (see 3.2.4. Theme: Therapy techniques and clinician skills for details).

### 3.2.7. Theme: preference

This theme explains the participants' preferences for continued service delivery of therapy. Five participants reported that they would prefer to continue with it because this delivery method was suitable for them. The remaining five participants stated that they would prefer in-person therapy if possible.

## 4. Discussion

The main objectives of the present study were to compare the effects of telepractice and in-person therapy on the severity of stuttering (Study 1) and to identify trends in the participants' and the clinician's qualitative experience of telepractice (Study 2).

The results of the quantitative study (Study 1) confirm the stated hypothesis that telepractice is as effective as in-person therapy on the dependent variables such as %SS and perceptual assessment scores studied. The findings of Study 1 are consistent with those of Bridgman et al. (2016), who compared the effectiveness of the webcam telepractice Lidcombe Program on children with stuttering using a randomized controlled trial. These results are also in line with the findings of other studies which used case report, clinical trial, or within-group design (Carey et al., 2012, 2014; Kully, 2000; O'Brian et al., 2014; Sicotte et al., 2003; Valentine, 2014).

While the results of the quantitative study (Study 1) indicate that the two methods had an equivalent effect/outcome on participants as a group, the findings of the qualitative study (Study 2) provide descriptions of the importance of the experiences and opinions related to these conditions. Therefore, the group and unique participant experiences are presented below and discussed in detail with two datasets.

### 4.1. Advantages of telepractice

Telepractice sessions are convenient because they are scheduled at a time and in an environment that are suitable for each participant, as noted by Tucker (2012b). This situation is reflected in the participants' report that the main advantages of telepractice are temporal flexibility ( $n = 6$ ) and spatial flexibility ( $n = 3$ ) and are consistent with the other studies (e.g., Carey et al., 2012). According to the participants' perspective, they could receive services without compromising their academic or vocational activities ( $n = 5$ ). As mentioned by the participants, telepractice is an 'efficient' method, not only reducing the time and finances spent but also avoiding travel fatigue (Carey et al., 2012; Mashima & Doarn, 2008; Towey, 2013).

### 4.2. Potential barriers and limitations of telepractice

The most frequently emphasized barriers to telepractice were internet connections ( $n = 8$ ), computers ( $n = 4$ ) and routine or non-routine audio problems ( $n = 4$ ), as reported in literature previously (Jahromi & Ahmadian, 2018; Tucker, 2012b).

Another important issue regarding telepractice is the cost. Some authors report that telepractice reduces many of the costs

associated with service delivery (Brienza & McCue, 2013; Goldberg, Haley, & Jacks, 2012; Theodoros, 2012). However, in the present study, the clinician and participants purchased extra equipment. Additionally, an alternative software system was purchased to prevent possible connection problems. In many studies, the lack of infrastructure and high economic costs were regarded as essential problems related to telepractice (American Speech-Language-Hearing Association, 2002; Dunkley et al., 2010; Plantak-Vukovac, Novosel-Herceg, & Orehovački, 2015; Wade, 2013). Also, contrary to what is reported in the literature (Bridgman et al., 2016; Carey et al., 2014), more time was lost compared to in-person sessions.

#### 4.3. Effects of telepractice on therapeutic components

##### 4.3.1. Therapeutic relationship

Some authors reported that there was no notable problem in establishing a therapeutic relationship in telepractice sessions (Hines, Lincoln, Ramsden, Martinovich, & Fairweather, 2015; Freckmann, Hines, & Lincoln, 2017; Hill & Miller, 2012). However, 50 % of the participants in the present study reported that in-person therapy encompasses a warmer personal relationship than telepractice. Also, T5 reported that he would prefer to first meet in-person with the therapist before selecting the method, while T1 reported that he would prefer this method because of the clinician's approach in the present study.

In the present study, the clinician tried to establish a close relationship by conducting in-person interviews in the three assessment stages and communicated with the participants using other technological means of communication, in line with Akamoglu, Meadan, Pearson, and Cummings (2018).

##### 4.3.2. The sense of naturalness, motivation, and concentration

Some participants stated that the telepractice sessions did not feel like the client and clinician were meeting from a distance, while some of the others felt that they had limited concentration and were less enthusiastic in the telepractice sessions. In the study by Tucker (2012b), a speech and language pathologist believed that headsets helped students maintain their attention. However, in the present study, the clinician's opinions supported the participants' perspectives. These opinions seem to be associated with individual personality traits as well as with the sense of reality and naturalness.

##### 4.3.3. Responsibility

One of the prominent themes in qualitative findings was "taking responsibility for the treatment." Plexico et al. (2005); Plexico, Manning, & DiLollo, 2010) recommend PWS to take responsibility for the success of stuttering therapy as much as the clinician does. This concept was also discussed within the context of telepractice by Carey et al. (2014) and Valentine (2014), and Hawkins (2012) and Stokes and Bear (1977) suggested that responsibility and self-management skills are improved through telepractice. However, in the present study, different experiences emerged. For example, consistent with the results of Tucker (2012b), some participants reported having difficulty in adapting to the therapy schedule delivered by telepractice. The clinician reported more frequent delays and cancellation of therapy sessions in the telepractice group.

While one participant felt like they have "less responsibility" in telepractice, another participant said that success was "in our own hands". Varying qualitative findings related to problems related to motivation or responsibility for the telepractice group suggest the concept of locus of control. Rotter (1990) describes the external locus of control as an individual's attribution to external factors such as chance, luck, fate, or any other powers other than the individual himself/herself.

##### 4.3.4. Eye contact

All the participants stated that they had no difficulty in establishing eye contact in telepractice. However, T3 and T4 warned that telepractice provided a suitable environment for avoiding eye contact. American Speech-Language-Hearing Association (2005) recommends that clinicians look directly at the camera to overcome this barrier. Nevertheless, here, a dilemma emerges, as pointed out by participant T7, who warned that the clinician may fail to notice the emotional state of a participant, and thereby, fail to use appropriate therapy techniques if they are strictly focused on staring at the camera. Scharff (2013) also supports this concern expressed by T7.

##### 4.3.5. Telepractice's effects on stuttering therapy techniques

Nine out of 10 participants did not experience any limitations in the implementation of techniques used in stuttering therapy. However, T7 stated that he sometimes had difficulty in understanding the exercises in telepractice and reported concerns regarding whether the therapist had sufficiently observed behaviors and the use of techniques by patients. Although Lowe et al. (2013) noted that uncertain or covert disfluencies could be detected through telepractice, the clinician's experience was more in line with T7's expressed concern.

Valentine (2014) argued that more effort was needed for the exercises via telepractice, and according to some authors, the nature of the method limits many clinician skills and the activities to be performed (Irani & Gabel, 2013; Tucker, 2012b; Valentine, 2014). The recommendation of combining in-person procedures in telepractice that was suggested by the participants seems to be a useful procedure to increase treatment success and generalization of therapy gains as described in other studies (Grogan-Johnson, Alvares, Rowan, & Creaghead, 2010; Steele, Baird, McCall, & Haynes, 2014; Valentine, 2014).

#### 4.4. The appropriate candidate for telepractice

##### 4.4.1. Familiarity with the technology

Some participants considered telepractice to be suitable for them due to the importance of computers in their lives, which is a 21st-century trend (Towey, 2013). However, even some participants who had difficulty using the technology found telepractice suitable for them. However, according to T7, an essential prerequisite to benefitting from telepractice is to have an adequate command of computer use. This view occupies an essential place in the literature (The Alberta College of Speech-Language Pathologists & Audiologists, 2009; Irani & Gabel, 2013; Tucker, 2012b).

##### 4.4.2. Personality and lifestyle

A theme related to personality and lifestyle was obtained within the scope of suitable candidate qualifications for telepractice. Regarding the suitable candidate criteria for telepractice, factors such as "flexible lifestyle" from T9's experience, "close relationship" from T7's experience, and "motivation, readiness and getting social support" from T1's experience have also emerged, which is consistent with the results of Tucker (2012b) or Valentine (2014).

T3 and T10 felt that telepractice was suitable for them due to their shyness, whereas T9 warned that the method might be unsuitable for people who are "shy and need to have physical contact", as with telepractice, these types of people, are "able to avoid social environments, hide their problems, and can program themselves for that time period of the session". Regarding this, participants T4, T7, and T9 recommended that the client personality should be assessed, and in-person interviews should be arranged before starting telepractice.

#### 4.5. Expectation for success

Some of the participants expected to have low interaction ( $n = 3$ ) and success ( $n = 2$ ) in telepractice. In harmony with the literature (Mashima & Doarn, 2008; Tucker, 2012b), all of the participants who had negative expectations reported that their negative opinions had changed and/or that they had grown accustomed to the method.

#### 4.6. Satisfaction for telepractice, the therapy program and the clinician

In the present study, nine out of 10 participants reported that they had benefitted from telepractice, and the quantitative data confirms this, which is consistent with the literature (Kully, 2000; Sicotte et al., 2003; Towey, 2013). One interesting result of the present study is that T3 (650 km) and T6 (362 km), who were living far away from therapy centers, made remarkable progress, according to the quantitative and qualitative data.

The participants' satisfaction with the therapy program was associated with some of the following factors: performing need-based activities, conducting a new activity every week, and sending e-mails and model videos. This approach, presented to the experimental and control groups, was intentionally selected by the clinician in order to prevent participants from staying alone and falling behind in the process. This recommendation is consistent with the perspectives of Plantak-Vukovac et al. (2015).

Some participants expressed satisfaction with the clinician in terms of patience in the face of problems and a supportive approach. These results are consistent with stuttering literature (2010, Plexico et al., 2005). The participants' satisfaction with the therapist's approach in the present study may have increased their satisfaction with telepractice.

#### 4.7. Dropout rates in the telepractice and in-person groups

Another type of data that may provide information on the suitability of telepractice for stuttering therapy may be the dropout rates. In this study, one participant (I6) before the post-test in the in-person group and one participant (T8) before the follow-up in the telepractice group left the study. This was in line with the dropout rates reported in other studies where stuttering therapy was provided over webcams. For example, in the study by Carey et al. (2014) on adolescents regarding the application of Camperdown via webcam, two of the 16 participants withdrew from the study before the maintenance stage. In the study by Bridgman et al. (2016) involving the webcam presentation of the Lidcombe program, 49 participants were randomly divided into the telepractice webcam group ( $n = 25$ ) and the control group ( $n = 24$ ). Before the 9-month post-randomization process, two participants in the telepractice group ( $n = 23$ ) and three participants in the control group ( $n = 21$ ) left the study. Before the 18-month post-randomization process, seven participants in the telepractice group ( $n = 16$ ) and four participants in the control group ( $n = 17$ ) left the study. Therefore, it is not possible to come to a clear conclusion regarding the dropout rates. When suitable candidates are selected for telepractice, and when the recommendations explained above are complied with, the dropout rates may be kept at a minimal level.

#### 4.8. Preference of delivery method in the future

Five participants shared that they felt telepractice was suitable for them, referring to their personal characteristics and advantages of telepractice. However, five other participants reported that they would choose in-person therapy if they could access those services, which was consistent with the literature (Carey et al., 2014; Langevin, Lomheim, & Williston, 2015). The positive perspectives of the participants on the advantages of telepractice are emphasized frequently in the literature (e.g., Jahromi & Ahmadian, 2018; McGill et al., 2019).

#### 4.9. Discussion of findings in terms of the Technology Acceptance Model (TAM)

Perspectives on the advantages of the participatory method used in telepractice can be interpreted using the TAM developed by Davis (1989). Especially regarding “perceived usefulness” (Agarwal & Prasad, 1999), most of the participants ( $n = 9$ ) reported they had benefitted from the therapy and expressed their satisfaction with the clinician. These perspectives of the participants also largely match the objective clinical data.

Participants’ familiarity with computer use was a prominent theme in the qualitative results. The perceived ease of use of technology and users’ experience with technology are essential factors in the acceptance and success of the technology (Sun & Zhang, 2006). Telepractice may be well received in Turkey, where the rate of computer and internet usage has been steadily rising, with an intense interest in smartphones as a result (Deloitte, 2015; TurkStat, 2017; TUSIAD, 2017).

#### 4.10. Clinical implications

Participants’ and the clinician’s perspectives may suggest some clinical implications. The first implication is related to participants’ hesitations about telepractice before the trials. To reduce uncertainty at this point, clinicians may offer user guides, learning with model videos and short trials. Moreover, in line with TAM (Davis, 1989), demonstration of the evidence related to the success of telepractice can increase the acceptance level with regards to telepractice.

In telepractice, clinicians can use different communication tools to establish therapeutic communication with participants and motivate them. They can include in-person trials, if possible. Procedures with strict rules are needed in many respects for the success of telepractice, just like in-person therapy. Along with every detail, such as control before each session, session schedule, session rules, and technological preparation should be linked to clear rules. Delivering stuttering therapy in an online environment may limit clinician skills. However, many of these barriers can be mitigated with practical solutions and new technologies in the future. For example, choral exercises in therapy were challenging due to routine time delays. One way to overcome this problem would be to use shadowing rather than choral exercise. Similarly, the webcam hardware size can be minimized and placed somewhere on the screen to overcome the eye contact barrier.

Based on the experiences and opinions of some participants, telepractice may not be suitable for every individual. Personal characteristics such as lifestyle, age, interest in the computer, psychological aspects, attention skills, computer anxiety, readiness, and responsibility are thought to be essential factors for determining the appropriate candidate criteria and ensuring success in telepractice.

#### 4.11. Limitations and future directions

The major limitation of this study was the lack of a specific program with evidence of effectiveness, such as the Camperdown Program (O’Brian, Packman, & Onslow, 2008), and in future studies, researchers may be recommended to use a program that has been found effective. The second limitation of the present study was the use of SSI-4, which has not yet been adopted in the Turkish population. Despite its’ limitations, the SSI-4 provided a way to demonstrate a holistic assessment with a standardized assessment tool. Conducting future studies with standardized measurement tools will make the outcomes more reliable.

Future researchers are recommended to use quantitative randomization procedures that are not used in this study. Satisfaction and acceptance of telepractice in stuttering management can be investigated in terms of age, gender, experience, culture, and technological factors.

### 5. Conclusion

The quantitative results of Study 1 and the participant and clinician perspectives of Study 2 collectively showed that telepractice may be as effective as in-person therapy and is a suitable method for adults who stutter who have difficulties in accessing in-person services. The participants considered telepractice to be the best option for clients where access to in-person therapy services is not possible; these participants perceived it to be an attractive choice with many procedural advantages that made it possible to reconcile the participants’ personal differences.

Due to many reasons, there is a need for telepractice for stuttering therapy services in Turkey. This delivery method can be a great alternative when in-person services cannot be carried out in circumstances such as rural life or global disasters like the COVID-19 pandemic. The present study is the first positive step related to the effectiveness and usefulness of stuttering therapy via telepractice in Turkey. Increasing interest in mobile devices, technology acquaintance, high ratio of the youth population, and the number of clinicians well-equipped with such tools suggest that this method can be an increasingly common practice.

#### Declaration of Competing Interest

The authors report no declarations of interest.

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## Appendix A. An Example of Therapy Plan

Information and Identification Stage (two sessions, one session per week)				
Session	Individual or Group Therapy	FS or SM	Goals	Activities
1	Individual	SM	to inform the participant about stuttering	The clinician gives basic information and examples about stuttering.
		SM	to support the participant to develop awareness about his/her stuttering	The clinician gives information about stuttering assessment results and shares his thoughts on the pre-assessment stage.
		FS - SM	to enable the participant to learn the therapy program	The therapist gives information about the rationale, content, and courses of approaches used.
		SM <sup>1</sup>	to help motivate the participants to improve their fluency	The participant explains his goals regarding the therapy. Discussing the participant's thoughts and feelings about therapy.
			to help the participant to develop self-awareness about his/her stuttering moments	The participant identifies the pseudo stuttering events in the clinician's speech and identifies disfluencies of the other PWS in the video (i.e., characteristics of disfluencies, duration, or physical reactions like physical tension).
2	Individual	SM	to support the participant to develop self-awareness about stuttering moments	The participant identifies stuttering moments in his/her video recordings.
		SM	to help the participant analyze what he/she was doing with stuttering	The participant explains this experience in detail immediately after the moment of stuttering.
			to encourage the participant to discover and work on feelings, thoughts, and behaviors related to his/her stuttering	Participants are provided with information about his/her multifaceted reactions to stuttering in line with the participant's OASES and SL-ILP-S scores and clinician's thoughts on pre-assessment.
		SM		The participant and clinician discuss the effects of stuttering reactions on his/her quality of life and participation in social life.
Fluency Shaping and Stuttering Modification Stage (seven sessions, one session per week)				
Session	Individual or Group Therapy	FS or SM	Goals	Activities
3	Individual	SM	to assist the participant in reducing his/her negative attitudes and reactions towards various contexts	The clinician and the participant discuss the participant's avoided situations, peoples, or settings.
		SM	to help the participant to analyze what she/he was doing with stuttering	The freezing activity is followed to pay maximum attention to stuttering behaviors (This activity also serves to desensitization).
		FS	to help the participant achieve stutter-free at a single word level.	FS techniques such as gentle onset and relaxed rate are studied via activities, such as word reading, picture naming, and finding suitable words. First, the clinician becomes a model. Then it is made in a choir. Then, the participant produces independently.
4	Individual		to support the participant in reducing negative attitudes and reactions from disfluencies and his/her negative attitudes and reactions towards various contexts	Emotions and thoughts about the contexts of avoiding stuttering are discussed.
		SM		First, the clinician exhibits an easier disfluency and asks the participant to imitate it (i.e., syllable repetitions, prolongations).
		FS	to help the participant achieve stutter-free at the phrase level	This stage includes phrase reading, describing action cards, pronouncing two words, question-answer studies (i.e., 'when' questions), completing a sentence with a phrase and telling the association between substances.
5	Individual		to support the participant in reducing negative attitudes and reactions from disfluencies (i.e., avoidance, fear, or physical tension)	The participant is asked to make voluntary stuttering in phrases (i.e., when the finger is flicked or when he/she wants to do). The participant is asked to undertake easy bouncing and stretching behaviors to vary stuttering.
		SM		The clinician and the participant discuss the participant's sensitivity to listener reactions.
		FS	to help the participant achieve stutter-free at the shorter sentence level	The participant is asked to discuss the stuttering with his/her close circle openly.
6	Individual		to assist the participant in reducing his/her negative attitudes and reactions towards various contexts	Shorter sentence reading, question-answer studies (i.e., 'why' questions), explanation of an object's function, etc.
		SM	to support the participant in reducing negative attitudes and reactions from disfluencies	The clinician inquires which context triggers participant's stuttering. Participants are asked to observe their fear and avoidance and identify specific areas of difficulty. Goals are then determined.
				The participant is asked to use voluntary stuttering in real disfluencies with various forms. As homework, the participant is asked to use it in daily life.

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7	Individual		to support the participant to increase the sense of control on his/her speech		The participants are asked to change their stuttering moments (e.g., longer-shorter, softer-harder). Loosening is attempted on block moment.
		FS	to help the participant achieve stutter-free at the longer sentence level		More extended sentence reading, sentence building with words presented, talking about vague pictures
		SM	to enable the participant to learn and use post-block management skills (cancellation)		The clinician shows how to use the technique, and the participants imitate the clinician by completing the pseudo stuttered word and then pause.
		SM	to support the participant in reducing negative attitudes and reactions from disfluencies		Voluntary stuttering with more challenging blocks is studied with the participants. Secondary behaviors are also imitated.
	FS	to help the participant achieve stutter-free at the multi-sentence (paragraph) level		Multi-sentence reading, explaining a detailed picture, describing 'before-after cards', describing 'verbs sequence' describing a well-known subject or story.	
	SM	to enable the participant to learn and use post-block management skills (cancellation)		The participant is asked to use the cancellation in real disfluencies. The participant detects and analyzes the stuttering moments, pantomimes quietly, and re-articulates the word with ease by the cancellation.	
	FS	to help the participant to use the skills he/she has previously learned for new tasks		Reading a text with long and complex sentences, telling the short story, problem-solving, etc.	
	FS	to enable the participant to achieve stutter-free at conversation in the clinic		Conversation with the clinician on a topic of choice	
8	Individual				The participant imitates the clinician as a model and tries it in real disfluencies. Participant "pull-outs" of the block in a relaxed without pausing, and then the participant elongates his/her words on a sound or word as it occurs.
		SM	to enable the participant to learn and use in-block management skills (pull-out)		Participant's sensitivity, reactions toward the listener's reactions, and its backstage are discussed, both in terms of the listener and the PWS perspective.
		SM	to assist the participant in reducing his/her negative attitudes and reactions towards various contexts		Read different text types (i.e., poem, news, drama), resume a story, etc.
		FS	to help the participant use skills he/she has previously learned for new tasks		Telling a real event, role-playing, discussing openly to comment topic with the clinician, etc.
		FS	to help the participant achieve stutter-free speech at conversation		The clinician becomes a model. The participant imitates the clinician and tries it in real disfluencies: The participant would use this skill on a sound or word before it occurs.
		SM	to enable the participant to learn and to use pre-block management skills (preparatory set)		Participants do this with more effortlessness and looser movements, thus facilitating tension on the articulators.
Group Therapy Stage (three sessions, one session per week)					
Session	Individual or Group Therapy	FS or SM	Goals		Activities
10	Group		to explain the structure of group therapy		The clinician describes the rationale, content, and rules of group therapy.
			To ensure warming-up between group members.		Participants play some word games, such as asking one another to comment on a fun topic on which they can comment shortly.
		SM	to encourage the participant to discover and work on feelings, thoughts, and behaviors related to his/her stuttering		The participants are encouraged to tell the other group members about their stuttering history.
		FS	to use fluency skills in a group		Participants explain their fluency characteristics. Participants do activities such as reading or narration with FS techniques
	Individual	SM	to assist the participant in reducing his/her negative attitudes and reactions towards various contexts		Using fluency techniques in some activities, such as role-playing, interview, presentation
			to help the participants to use SM skills in daily life		The clinician discusses with the participant on "which contexts are worse for stuttering moments?". Goals are determined in this direction.
		FS	to enable the participant to generalize the fluency skills gained in the clinical environment to other environments.		The clinician discusses with the patient the situation in which they use SM techniques, such as pull-out. Then goals are determined.
		SM	to encourage the participant to discover and work on feelings, thoughts, and behaviors related to his/her stuttering		A difficulty hierarchy is created about the new challenges with the participant. Personal goals are determined (i.e., situation, person, or feeling). Participants are given homework to speak to known and unknown people.
11	Group				Participants explain their positive or negative experiences of stuttering.
		FS	to use fluency skills in a group		Using fluency techniques in some activities, such as phone conversation and performing difficult situations. Participants make recommendations to each other about the use of therapy techniques.
	Individual	SM	to support the participant in reducing negative attitudes and reactions from disfluencies		Participants are asked to exhibit voluntary stuttering in more demanding environments.

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12	Group	SM	to help the participants use SM skills in daily life	The clinician discusses with the patient the situation in which they use SM techniques, such as pull-out. Then goals are determined.
		FS	to enable the participant to generalize the fluency skills to other environments.	Personal goals are determined for generalization. They are given homework to speak on the phone.
		SM	to encourage the participant to discover and work on feelings, thoughts, and behaviors related to his/her stuttering	Participants discuss ‘the meaning of stuttering’, talk about ‘what would have changed without stuttering?’ and share their thoughts and feelings about various topics.
		FS	to use fluency skills in a group	Participants use communication modalities such as interpretation and discussion within the group
		FS	to ensure that the participant turns into a more natural speech when using FS techniques	They are informed about typical prosodic features (i.e., rhythm, pitch, stress, intonation). A speech that was fluent but also perceived as more natural is studied.
	Individual	FS	to enable the participant to generalize the fluency skills to new environments	Personal goals are determined (an i.e., situation, setting, person, or feeling), and homework assignments, such as speaking in a group, are given.
		SM	to help the participants use SM skills in daily life	Participants are asked to use their SM skills in challenging moments of daily life.
		FS	to support participants to maintain treatment gains	Participants are given goals and homework assignments during the post-assessment phase.
	Maintenance and Group Therapy Stage (five sessions in four months)			
	Session	Individual or Group Therapy	FS or SM	Goals
13–17	Group (1,5 h)	FS	to enable the participants to use fluency skills in a group	Observing each other, being a model and advising other participants using fluency enhancing techniques in various challenging group activities
			to encourage the participant to discover and work on feelings, thoughts, and behaviors related to his/her stuttering	Voluntary stuttering experiments are conducted. Participants are encouraged to talk about their experiences of stuttering openly with some activities.
		SM	to encourage the participant to improve his/her coping skills with stuttering in a group setting	Participants are expected to share openly about their experiences on stuttering and are expected to help other group members with their difficulties.
			to enable the participants to use SM skills, such as pull-out in a group	Participants are asked to use SM techniques in the group, and share their experiences of the procures to follow up.
	Individual (average 15 min)	FS	to ensure that the participant recognizes changes in themselves and know what to do if his/her fluency get worse on the maintenance stage	Participants are informed about maintaining motivation, following fluency, recognizing relapses, and recovering themselves. The participants are asked to evaluate their fluency a daily with a 10-point scale.
				Individualized homework and goals for new transfer activities are presented in order to maintain the participants' fluency.
	Individual (average 15 min)	SM	supporting the participant to take responsibility for his/her fluency	The participant is encouraged to take responsibility. Participants are suggested to maintain monitoring skills so that they can determine their difficulties and continue to improve skills related to SM procedures.

- If the participant can quickly achieve a level, an advanced level is also studied in that session. Some participants started directly at the level of the sentence. Also, some participants and techniques were studied sequentially. For example, easy onset and flexible rate were studied first; after that, the light contact technique was started. As long as the targeted utterances have been extended, the emphasis is always on the techniques of continuous voicing and pausing.
- Within the scope of the counseling, the clinician has sought to provide therapeutic conditions, including transparency, unconditional positive respect, and empathic understanding, self-disclosure. Also, the clinician used therapeutic communication skills, such as open-ended questions, active listening, showing interest, follow nonverbal communication, maintain eye contact appropriately, empathic response, and reflection techniques.
- The therapy program used in this study was developed using the stuttering literature (American Speech-Language-Hearing Association, 1995; Bloodstein & Bernstein-Ratner, 2008; Guitar, 2014; Guitar & McCauley, 2012; Topbaş et al., 2011; Yairi & Seery, 2014; Zebrowski & Kelly, 2002).

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